

NASA Facts

National Aeronautics and
Space Administration



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STENNIS SPACE CENTER, NASA'S LEAD CENTER FOR ROCKET PROPULSION TESTING

Stennis Space Center is NASA's lead center for rocket propulsion testing and manages the Agency's rocket propulsion test assets, including facilities at the Marshall Space Flight Center in Alabama, the White Sands Test Facility in New Mexico, and the Glenn Research Center's Plumbrook Station in Ohio.

Building on its role in engine and vehicle testing spanning 30 years, Stennis is a Center of Excellence for propulsion testing, providing test services for government and commercial customers.

Stennis Test Facilities

Stennis Space Center's propulsion test facilities provide the nation with the most economical and efficient path to more routine access to space. Stennis has modern, state-of-the-art facilities that are used for propulsion-related testing.

Three stands were originally built in the early 1960s to test the first and second stages of the Saturn V rocket that safely transported Americans to the Moon. They are the single-position A-1 and A-2 stands and the dual-position B test stand. In 1975, all three stands began testing the main engines for the Space Shuttle.

The stands are linked by a 7.5-mile canal system used primarily for transporting liquid propellants. Additional features of the test complex include test control centers, data acquisition facilities, a large high-pressure gas facility, a high-pressure water facility that is served by a 66-million gallon reservoir, and an electrical generation plant.

Space Shuttle Main Engine Testing

Every Space Shuttle Main Engine (SSME) undergoes acceptance testing at Stennis. The engine is installed vertically in one of the large test stands, where an acceptance test firing is performed. Once proven flight worthy, the engine is transported to the Kennedy Space Center in Florida for installation on an orbiter.

The Space Shuttle is the backbone of NASA's human space exploration. It is the workhorse for deploying the International Space Station, a permanent laboratory where humans are pursuing cutting-edge science that will enhance life on Earth for future generations. Current plans are to use the Space Shuttle and SSMEs well into this century.

Component Testing

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The E-Complex test facility serves as a developmental rocket engine component test facility for future generation rocket engines. The flexible three-stand complex can carry out rocket engine testing or other types of testing involving ultra high-pressure gases and high-pressure, super-cold fluids. One of its first uses was to ground test rocket engine components for the Reusable Launch Vehicle (RLV) program.

Stennis research engineers also use the E-Complex facilities to advance knowledge in test technology areas, such as instrumentation, the study of exhaust plumes, test facility design and capability, and data acquisition.

Future Rocket Test Programs

Safe and affordable space transportation is the highest priority for NASA's Space Launch Initiative that will provide commercial industry with the opportunity to meet NASA's future launch needs. Stennis Space Center conducted tests on engines for the X-33 and X-34. Through these programs, a wealth of technology was gained that can be used for future vehicles.

As NASA's lead center for propulsion testing, Stennis will play an integral role in testing component and propulsion systems of the future such as the Rocket-Based Combined Cycle (RBCC) propulsion system — an airbreathing rocket designed to help reduce the amount of on-board propellant used to launch a vehicle to orbit. The RBCC, scheduled for development and testing at Stennis in 2003, is a strong candidate for meeting the Spaceliner 100 goals of lowering costs of lifting payloads into space and increasing vehicle reliability and crew safety.

Commercial Testing

Commercial test programs are also conducted at Stennis Space Center. For example, Stennis has been selected to assemble and test the RS-68 engine and the Common Booster Core for the Boeing Company's Delta IV rocket. The RS-68 is the world's largest liquid-hydrogen, liquid-oxygen engine. Boeing has leased the B-1 test stand from NASA for these tests.